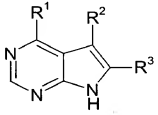
CLAIMS

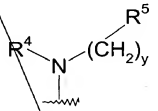
1. A compound of the formula



I

or the pharmaceutically acceptable salt thereof; wherein

R^1 is a group of the formula

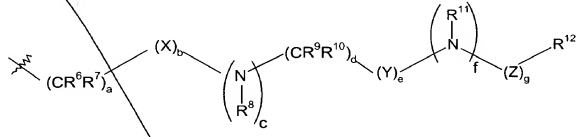


wherein y is 0, 1 or 2;

R^4 is selected from the group consisting of hydrogen, (C_1-C_6)alkyl, (C_1-C_6)alkylsulfonyl, (C_2-C_6)alkenyl, (C_2-C_6)alkynyl wherein the alkyl, alkenyl and alkynyl groups are optionally substituted by deuterium, hydroxy, amino, trifluoromethyl, (C_1-C_4)alkoxy, (C_1-C_6)acyloxy, (C_1-C_6)alkylamino, $((C_1-C_6)alkyl)_2$amino, cyano, nitro, (C_2-C_6)alkenyl, (C_2-C_6)alkynyl or (C_1-C_6)acylamino; or R^4 is (C_3-C_{10})cycloalkyl wherein the cycloalkyl group is optionally substituted by deuterium, hydroxy, amino, trifluoromethyl, (C_1-C_6)acyloxy, (C_1-C_6)acylamino, (C_1-C_6)alkylamino, $((C_1-C_6)alkyl)_2$amino, cyano, cyano(C_1-C_6)alkyl, trifluoromethyl(C_1-C_6)alkyl, nitro, nitro(C_1-C_6)alkyl or (C_1-C_6)acylamino;

R^5 is (C_2-C_9)heterocycloalkyl wherein the heterocycloalkyl groups must be substituted by one to five carboxy, cyano, amino, deuterium, hydroxy, (C_1-C_6)alkyl, (C_1-C_6)alkoxy, halo, (C_1-C_6)acyl, (C_1-C_6)alkylamino, amino(C_1-C_6)alkyl, (C_1-C_6)alkoxy-CO-NH, (C_1-C_6)alkylamino-CO-, (C_2-C_6)alkenyl, (C_2-C_6) alkynyl, (C_1-C_6)alkylamino, amino(C_1-C_6)alkyl, hydroxy(C_1-C_6)alkyl, (C_1-C_6)alkoxy(C_1-C_6)alkyl, (C_1-C_6)acyloxy(C_1-C_6)alkyl, nitro, cyano(C_1-C_6)alkyl, halo(C_1-C_6)alkyl, nitro(C_1-C_6)alkyl, trifluoromethyl, trifluoromethyl(C_1-C_6)alkyl, (C_1-C_6)acylamino, (C_1-C_6)acylamino(C_1-C_6)alkyl, (C_1-C_6)alkoxy(C_1-C_6)acylamino, amino(C_1-C_6)acyl, amino(C_1-C_6)acyl(C_1-C_6)alkyl, (C_1-C_6)alkylamino(C_1-C_6)acyl, $((C_1-C_6)alkyl)_2$amino(C_1-C_6)acyl, $R^{15}R^{16}$N-CO-O-, $R^{15}R^{16}$N-CO-(C_1-C_6)alkyl, (C_1-C_6)alkyl-

$S(O)_m$, $R^{15}R^{16}NS(O)_m$, $R^{15}R^{16}NS(O)_m$ (C_1-C_6)alkyl, $R^{15}S(O)_m R^{16}N$, $R^{15}S(O)_mR^{16}N(C_1$-C_6)alkyl wherein m is 0, 1 or 2 and R^{15} and R^{16} are each independently selected from hydrogen or (C_1-C_6)alkyl; or a group of the formula



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wherein a is 0, 1, 2, 3 or 4;

b, c, e, f and g are each independently 0 or 1;

d is 0, 1, 2, or 3;

X is $S(O)_n$ wherein n is 0, 1 or 2; oxygen, carbonyl or –C(=N-cyano)-;

Y is $S(O)_n$ wherein n is 0, 1 or 2; or carbonyl; and

Z is carbonyl, C(O)O-, C(O)NR- or $S(O)_n$ wherein n is 0, 1 or 2;

R^6, R^7, R^8, R^9, R^{10} and R^{11} are each independently selected from the group consisting of hydrogen or (C_1-C_6)alkyl optionally substituted by deuterium, hydroxy, amino, trifluoromethyl, (C_1-C_6)acyloxy, (C_1-C_6)acylamino, (C_1-C_6)alkylamino, ((C_1-C_6)alkyl)$_2$amino, cyano, cyano(C_1-C_6)alkyl, trifluoromethyl(C_1-C_6)alkyl, nitro, nitro(C_1-C_6)alkyl or (C_1-C_6)acylamino;

R^{12} is carboxy, cyano, amino, oxo, deuterium, hydroxy, trifluoromethyl, (C_1-C_6)alkyl, trifluoromethyl(C_1-C_6)alkyl, (C_1-C_6)alkoxy, halo, (C_1-C_6)acyl, (C_1-C_6)alkylamino, ((C_1-C_6)alkyl)$_2$ amino, amino(C_1-C_6)alkyl, (C_1-C_6)alkoxy-CO-NH, (C_1-C_6)alkylamino-CO-, (C_2-C_6)alkenyl, (C_2-C_6) alkynyl, (C_1-C_6)alkylamino, hydroxy(C_1-C_6)alkyl, (C_1-C_6)alkoxy(C_1-C_6)alkyl, (C_1-C_6)acyloxy(C_1-C_6)alkyl, nitro, cyano(C_1-C_6)alkyl, halo(C_1-C_6)alkyl, nitro(C_1-C_6)alkyl, trifluoromethyl, trifluoromethyl(C_1-C_6)alkyl, (C_1-C_6)acylamino, (C_1-C_6)acylamino(C_1-C_6)alkyl, (C_1-C_6)alkoxy(C_1-C_6)acylamino, amino(C_1-C_6)acyl, amino(C_1-C_6)acyl(C_1-C_6)alkyl, (C_1-C_6)alkylamino(C_1-C_6)acyl, ((C_1-C_6)alkyl)$_2$amino(C_1-C_6)acyl, $R^{15}R^{16}$N-CO-O-, $R^{15}R^{16}$N-CO-(C_1-C_6)alkyl, R^{15}C(O)NH, R^{15}OC(O)NH, R^{15}NHC(O)NH, (C_1-C_6)alkyl-$S(O)_m$, (C_1-C_6)alkyl-$S(O)_m$-(C_1-C_6)alkyl, $R^{15}R^{16}NS(O)_m$, $R^{15}R^{16}NS(O)_m$ (C_1-C_6)alkyl, $R^{15}S(O)_m R^{16}N$, $R^{15}S(O)_mR^{16}N(C_1$-C_6)alkyl wherein m is 0, 1 or 2 and R^{15} and R^{16} are each independently selected from hydrogen or (C_1-C_6)alkyl;

R^2 and R^3 are each independently selected from the group consisting of hydrogen, deuterium, amino, halo, hydoxy, nitro, carboxy, $(C_2$-$C_6)$alkenyl, $(C_2$-$C_6)$alkynyl, trifluoromethyl, trifluoromethoxy, $(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkoxy, $(C_3$-$C_{10})$cycloalkyl wherein the alkyl, alkoxy or cycloalkyl groups are optionally substittued by one to three groups selected from halo, hydroxy, carboxy, amino $(C_1$-$C_6)$alkylthio, $(C_1$-$C_6)$alkylamino, $((C_1$-$C_6)$alkyl$)_2$amino, $(C_5$-$C_9)$heteroaryl, $(C_2$-$C_9)$heterocycloalkyl, $(C_3$-$C_9)$cycloalkyl or $(C_6$-$C_{10})$aryl; or R^2 and R^3 are each independently $(C_3$-$C_{10})$cycloalkyl, $(C_3$-$C_{10})$cycloalkoxy, $(C_1$-$C_6)$alkylamino, $((C_1$-$C_6)$alkyl$)_2$amino, $(C_6$-$C_{10})$arylamino, $(C_1$-$C_6)$alkylthio, $(C_6$-$C_{10})$arylthio, $(C_1$-$C_6)$alkylsulfinyl, $(C_6$-$C_{10})$arylsulfinyl, $(C_1$-$C_6)$alkylsulfonyl, $(C_6$-$C_{10})$arylsulfonyl, $(C_1$-$C_6)$acyl, $(C_1$-$C_6)$alkoxy-CO-NH-, $(C_1$-$C_6)$alkyamino-CO-, $(C_5$-$C_9)$heteroaryl, $(C_2$-$C_9)$heterocycloalkyl or $(C_6$-$C_{10})$aryl wherein the heteroaryl, heterocycloalkyl and aryl groups are optionally substituted by one to three halo, $(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkyl-CO-NH-, $(C_1$-$C_6)$alkoxy-CO-NH-, $(C_1$-$C_6)$alkyl-CO-NH-$(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkoxy-CO-NH-$(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkoxy-CO-NH-$(C_1$-$C_6)$alkoxy, carboxy, carboxy$(C_1$-$C_6)$alkyl, carboxy$(C_1$-$C_6)$alkoxy, benzyloxycarbonyl$(C_1$-$C_6)$alkoxy, $(C_1$-$C_6)$alkoxycarbonyl$(C_1$-$C_6)$alkoxy, $(C_6$-$C_{10})$aryl, amino, amino$(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkoxycarbonylamino, $(C_6$-$C_{10})$aryl$(C_1$-$C_6)$alkoxycarbonylamino, $(C_1$-$C_6)$alkylamino, $((C_1$-$C_6)$alkyl$)_2$amino, $(C_1$-$C_6)$alkylamino$(C_1$-$C_6)$alkyl, $((C_1$-$C_6)$alkyl$)_2$amino$(C_1$-$C_6)$alkyl, hydroxy, $(C_1$-$C_6)$alkoxy, carboxy, carboxy$(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkoxycarbonyl, $(C_1$-$C_6)$alkoxycarbonyl$(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkoxy-CO-NH-, $(C_1$-$C_6)$alkyl-CO-NH-, cyano, $(C_5$-$C_9)$heterocycloalkyl, amino-CO-NH-, $(C_1$-$C_6)$alkylamino-CO-NH-, $((C_1$-$C_6)$alkyl$)_2$amino-CO-NH-, $(C_6$-$C_{10})$arylamino-CO-NH-, $(C_5$-$C_9)$heteroarylamino-CO-NH-, $(C_1$-$C_6)$alkylamino-CO-NH-$(C_1$-$C_6)$alkyl, $((C_1$-$C_6)$alkyl$)_2$amino-CO-NH-$(C_1$-$C_6)$alkyl, $(C_6$-$C_{10})$arylamino-CO-NH-$(C_1$-$C_6)$alkyl, $(C_5$-$C_9)$heteroarylamino-CO-NH-$(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkylsulfonyl, $(C_1$-$C_6)$alkylsulfonylamino, $(C_1$-$C_6)$alkylsulfonylamino$(C_1$-$C_6)$alkyl, $(C_6$-$C_{10})$arylsulfonyl, $(C_6$-$C_{10})$arylsulfonylamino, $(C_6$-$C_{10})$arylsulfonylamino$(C_1$-$C_6)$alkyl, $(C_1$-$C_6)$alkylsulfonylamino, $(C_1$-$C_6)$alkylsulfonylamino$(C_1$-$C_6)$alkyl, $(C_5$-$C_9)$heteroaryl or $(C_2$-$C_9)$heterocycloalkyl.

2. A compound according to claim 1, wherein a is 0; b is 1; X is carbonyl; c is 0; d is 0; e is 0; f is 0; and g is 0.

3. A compound according to claim 1, wherein a is 0; b is 1; X is carbonyl; c is 0; d is 1; e is 0; f is 0, and g is 0.

4. A compound according to claim 1, wherein a is 0; b is 1; X is carbonyl; c is 1; d is 0; e is 0; f is 0; and g is 0.

5. A compound according to claim 1, wherein a is 0; b is 1; X is –C(=N=cyano)-; c is 1; d is 0; e is 0; f is 0; and g is 0.

6. A compound according to claim 1, wherein a is 0; b is 0; c is 0; d is 0; e is 0; f is 0; g is 1; and Z is –C(O)-O-.

7. A compound according to claim 1, wherein a is 0; b is 1; X is $S(O)_n$; n is 2; c is 0; d is 0; e is 0; f is 0; and g is 0.

8. A compound according to claim 1, wherein a is 0; b is 1; X is $S(O)_n$; n is 2; c is 0; d is 2; e is 0; f is 1; g is 1; and Z is carbonyl.

9. A compound according to claim 1, wherein a is 0; b is 1; X is $S(O)_n$; n is 2; c is 0; d is 2; e is 0; f is 1; and g is 0.

10. A compound according to claim 1, wherein a is 0; b is 1; X is carbonyl; c is 1; d is 0; e is 1; Y is $S(O)_n$; n is 2; f is 0; and g is 0.

11. A compound according to claim 1, wherein a is 0; b is 1; X is $S(O)_n$; n is 2; c is 1; d is 0; e is 0; f is 0; and g is 0.

12. A compound according to claim 1, wherein a is 1; b is 1; X is carbonyl; c is 1; d is 0; e is 0; f is 0; and g is 0.

13. A compound according to claim 1, wherein a is 0; b is 1; X is $S(O)_n$; c is 0; d is 1; e is 1; Y is $S(O)_n$; n is 2; f is 0; and g is 0.

14. A compound according to claim 1, wherein a is 0; b is 1; X is $S(O)_n$; c is 0; d is 2, 3 or 4; e is 1; Y is $S(O)_n$; n is 2; f is 1; and g is 0.

15. A compound according to claim 1, wherein a is 0; b is 1; X is oxygen; c is 0; d is 2, 3 or 4; e is 1; Y is $S(O)_n$; n is 2; f is 1; and g is 0.

16. A compound according to claim 1, wherein a is 0; b is 1; X is oxygen; c is 0; d is 2, 3 or 4; e is 1; Y is $S(O)_n$; n is 2; f is 0; and g is 0.

17. A compound according to claim 1, wherein a is 0; b is 1; X is carbonyl; c is 1; d is 2, 3 or 4; e is 1; Y is $S(O)_n$; f is 0; and g is 0.

18. A compound according to claim 1, wherein a is 0; b is 1; X is carbonyl; c is 1; d is 2, 3 or 4; e is 1; Y is $S(O)_n$; n is 2; f is 1; and g is 0.

19. A compound according to claim 1, wherein R^{12} is cyano, trifluoromethyl, (C_1-C_6)alkyl, trifluoromethyl(C_1-C_6)alkyl, (C_1-C_6)alkylamino, ((C_1-C_6)alkyl)$_2$amino, (C_2-C_6)alkynyl, cyano(C_1-C_6)alkyl, (C_1-C_6)alkyl-$S(O)_m$ wherein m is 0, 1 or 2.

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20. A compound according to claim 1, wherein said compound is selected from the group consisting of:

Methyl-[4-methyl-1-(propane-1-sulfonyl)-piperidin-3-yl]-(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amine;

4-Methyl-3-[methyl-(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amino]-piperidine-1-carboxylic acid methyl ester;

3,3,3-Trifluoro-1-{4-methyl-3-[methyl-(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amino]-piperidin-1-yl}-propan-1-one;

4-Methyl-3-[methyl-(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amino]-piperidine-1-carboxylic acid dimethylamide;

({4-Methyl-3-[methyl-(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amino]-piperidine-1-carbonyl}-amino)-acetic acid ethyl ester;

3-{4-Methyl-3-[methyl-(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amino]-piperidin-1-yl}-3-oxo-propionitrile;

3,3,3-Trifluoro-1-{4-methyl-3-[methyl-(5-methyl-7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amino]-piperidin-1-yl}-propan-1-one;

1-{4-Methyl-3-[methyl-(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amino]-piperidin-1-yl}-but-3-yn-1-one;

1-{3-[(5-Chloro-7H-pyrrolo[2,3-d]pyrimidin-4-yl)-methyl-amino]-4-methyl-piperidin-1-yl}-propan-1-one;

1-{3-[(5-Fluoro-7H-pyrrolo[2,3-d]pyrimidin-4-yl)-methyl-amino]-4-methyl-piperidin-1-yl}-propan-1-one;

N-cyano-4-methyl-3-[methyl-(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amino]-N'-propyl-piperidine-1-carboxamidine; and

N-cyano-4,N',N'-Trimethyl-3-[methyl-(7H-pyrrolo[2,3-d]pyrimidin-4-yl)-amino]-piperidine-1-carboxamidine.

21. A pharmaceutical composition for (a) treating or preventing a disorder or condition selected from organ transplant rejection, xeno transplation, lupus, multiple sclerosis, rheumatoid arthritis, psoriasis, Type I diabetes and complications from diabetes, cancer, asthma, atopic dermatitis, autoimmune thyroid disorders, ulcerative colitis, Crohn's disease, Alzheimer's disease, leukemia and other autoimmune diseases or (b) the inhibition of protein kinases or Janus Kinase 3 (JAK3) in a mammal, including a human, comprising an amount of a compound of

claim 1 or a pharmaceutically acceptable salt thereof, effective in such disorders or conditions and a pharmaceutically acceptable carrier.

22. A pharmaceutical composition for (a) treating or preventing a disorder or condition selected from organ transplant rejection, xeno transplation, lupus, multiple sclerosis, rheumatoid arthritis, psoriasis, Type I diabetes and complications from diabetes, cancer, asthma, atopic dermatitis, autoimmune thyroid disorders, ulcerative colitis, Crohn's disease, Alzheimer's disease, leukemia and other autoimmune diseases or (b) the inhibition of protein kinases or Janus Kinase 3 (JAK3) in a mammal, including a human, comprising an amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof, alone or in combination with one or more additional agents which modulate a mammalian immune system or with antiinflammatory agents, effective in such disorders or conditions and a pharmaceutically acceptable carrier.

23. A method for the inhibition of protein kinases or Janus Kinase 3 (JAK3) in a mammal, including a human, comprising administering to said mammal an effective amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof.

24. A method for treating or preventing a disorder or condition selected from organ transplant rejection, xeno transplation, lupus, multiple sclerosis, rheumatoid arthritis, psoriasis, Type I diabetes and complications from diabetes, cancer, asthma, atopic dermatitis, autoimmune thyroid disorders, ulcerative colitis, Crohn's disease, Alzheimer's disease, leukemia and other autoimmune diseases in a mammal, including a human, comprising administering to said mammal an amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof, effective in treating such a condition.

25. A method for the inhibition of protein kinases or Janus Kinase 3 (JAK3) in a mammal, including a human, comprising administering to said mammal an effective amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof alone or in combination with one or more additional agents which modulate a mammalian immune system or with antiinflammatory agents.

26. A method for treating or preventing a disorder or condition selected from organ transplant rejection, xeno transplation, lupus, multiple sclerosis, rheumatoid arthritis, psoriasis, Type I diabetes and complications from diabetes, cancer, asthma, atopic dermatitis, autoimmune thyroid disorders, ulcerative colitis,

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Crohn's disease, Alzheimer's disease, leukemia and other autoimmune diseases in a mammal, including a human, comprising administering to said mammal an amount of a compound of claim 1 or a pharmaceutically acceptable salt thereof, alone or in combination with one or more additional agents which modulate a mammalian immune system or with antiinflammatory agents, effective in treating such a condition.

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